

CASE STUDY

CHUM - Notre Dame Hospital



Project Details

Location

Montreal, Quebec

Number of Buildings

1 complex comprising of 8 interconnected wings

System Implemented

Heating plant, closed-loop geothermal system, LED lighting, VAV, coils

Project Goal

Reduce the CHUM's carbon footprint and energy consumption

Impact at a Glance

✓ **43,5 %** reduction in energy consumption
(1,26 GJ/m² residual)

✓ GHG reduction of 9,450 tons of CO₂/year (80% of the site's emissions)

✓ Annual savings of **\$1,677,819** validated through M&V



Challenge

CHUM's Notre-Dame Hospital, a leading teaching hospital in the heart of Montreal, was operating with an aging energy infrastructure heavily reliant on heavy fuel oil—an energy source that is both costly and carbon-intensive. The complexity of the site, spread across eight interconnected buildings, made any intervention particularly challenging from a logistical standpoint.

Maintaining hospital operations at all times, space constraints in a dense urban environment, and the need to comply with the rigorous standards of a healthcare setting presented significant challenges to overcome in order to achieve ambitious carbon reduction targets.



Methodology

Comprehensive energy audit of the 8 pavilions to establish consumption baselines.

Identification of critical areas: heating, cooling, and lighting.

Assessment of geotechnical constraints for the feasibility of a geothermal field in an urban setting.

Integrated design of energy efficiency measures with performance guarantees.

Turnkey implementation: project management, engineering, construction, training, awareness-raising, and M&V monitoring.



Solution

- ✓ Complete modernization of the thermal power plant, including the total elimination of heavy fuel oil.
- ✓ Installation of a closed-loop geothermal system: 20 600-foot wells supplying two-stage heat pumps (2 × 70 tons).
- ✓ Replacement of 13,500 lighting fixtures with high-performance luminaires.
- ✓ Conversion of the kitchen hood to variable air volume (VAV) to optimize ventilation.
- ✓ Replacement of direct expansion coils to improve air conditioning efficiency.



The Ripple Effect

- ✓ **Financial:** Annual savings of over \$1.6 million supporting long-term hospital infrastructure funding.
- ✓ **Operational:** Thermal infrastructure on the scale of a district heating network across 8 buildings, with increased reliability and climate resilience.
- ✓ **Environmental / ESG:** Complete elimination of heavy fuel oil. Notre-Dame Hospital stands out as a performance model at 1.26 GJ/m². Five awards, including the 2017 Énergie Award from the AQME.
- ✓ **Strategic:** A pioneering institutional geothermal project in Montreal, demonstrating the replicability of the approach in other healthcare facilities in high-density built-up areas.



Awards & Recognitions

- ✓ 2014 Novae Award for Corporate Citizenship (Carbon Footprint category)
- ✓ Winner of the 2014 Contech Innovation and Sustainable Development Awards (Innovative Practices category)
- ✓ Energy Efficiency Award: Contech 2014
- ✓ Finalist for the AGPI's 2014 Golden Pillars Award
- ✓ 2017 Énergie Award, AQME (Existing Building – Institutional Sector category)